[0046] As is known in the art, viable signal transmission depends on the ability to control several factors (e.g. dispersion, noise, signal power, cross-talk, non-linear effects, etc.) that depend on bulk optical signal properties (the aggregate of in-service wavelengths). The testing of viability of a communications channel therefore requires examination of transmission equipment parameters. Moreover, the controlled introduction of new channel signals over wavelengths may require adjustments of one or more of those parameters. In particular, settings of devices adapted to control a respective factor may need to be adjusted just prior to the introduction of the channel signal in order to avoid upsetting a transmission equilibrium. A step-by-step approach to obtaining a wavelength(s) to support a channel is therefore desired to avoid the complex and expensive calculation of the adjustment of factors. In accordance with the present invention, a wavelength is first selected according to rules abstracted from physical propagation constraints and resource availability information, and then the resource availability is confirmed prior to the calculation of the adjustment factors. The calculation of the adjustment factors also serves as a final check on the viability of the wavelength(s).

[0047] A method of determining a communications channel to satisfy a data transport service request is illustrated in FIG. 3. A service request is received by the service management module 50, in step 100. The service management module 50 stores usage information representative of, for example, an available capacity on all established channels in the agile optical network 8. The service management module is therefore able to determine whether the required

capacity at a requested class of service (CoS) is available to satisfy the service request. If capacity to satisfy the request exists on an established communications channel (determined in step 102), the communications channel is selected to satisfy the request (step 104), and the usage information for the channel is updated to reflect the added traffic. If it is determined by the service management module 50 in step 102 that no established communications channel has capacity available to satisfy the request, the service management module 50 formulates a capacity request, which is sent to the WRM module 54 in step 106. If the WRM responds that capacity is not available for any reason or if there are multiple competing requests on the same path, a back-off algorithm may be used. This may incorporate a randomizer to limit recurring conflicting requests. The capacity request is received by the WRM 54, and a route is selected (step 108) from a plurality of potential routes between the network elements indicated in the capacity request. A simple rule for the viability of the route such as total distance or number of spaces may be used. Another method could be to pre-segment the network into islands of reach. The set of routes varies as routes are added or removed with updates as required in a prescribed manner. The discovery of new signaling links, and the loss of links that are out of service, yield changes to the routing tables in a manner well known in the art. Route selection algorithms based on cost, or other factors, are also well known.

[0048] After a route is selected, the WRM module 54 selects at least one wavelength to support the communications channel on the selected route (step 110). Each of the at least one wavelength(s) is restricted to the

route, and, if more than one wavelength is selected, the wavelengths collectively span the route without overlap. The selection of the wavelength(s) is governed by resource availability information, and rules abstracted from network signal propagation constraints. The resource availability information is used to ensure that the resources required to support the communications channel are likely to be available, and the rules are used to predict whether a communications channel established using the selected wavelength(s) is likely to be viable.

[0049] After the wavelength(s) for the communications channel are selected by the WRM module 54, the proposed route and selected wavelength(s) are passed to the C-BRV module 55. The C-BRV module 55 retrieves relevant properties of transmission equipment in the links spanned by the wavelength(s) (step 112). The availability of the selected wavelength(s) over the route is then verified to ensure that the resources selected for the communications channel by the WRM 54 are available and in service, or may be brought into service (step 114). If the C-BRV 55 determines that the resources are available, the link budget for each wavelength(s) is calculated, and settings for the transmission equipment are determined, in order to ensure that the communications channel is viable (step 116). The calculation of the link budget preferably factors in at least one of the following constraints; signal to noise ratios, channel powers, total power, distance, number of optical spans, fibre type(s) of each span, total number of wavelengths, dispersion, fibre non-linearities, and equipment induced signal degradation. If the link budget is met, and the values of the parameters lie within tolerances (determined in step 118), the